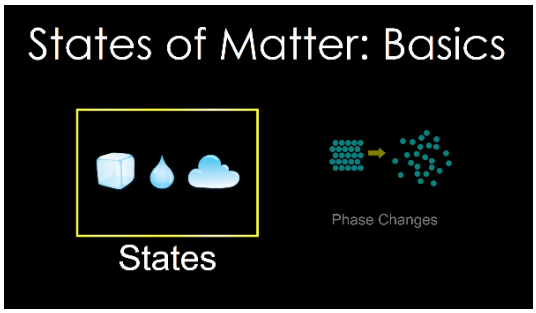
Molecules in Motion Exploration

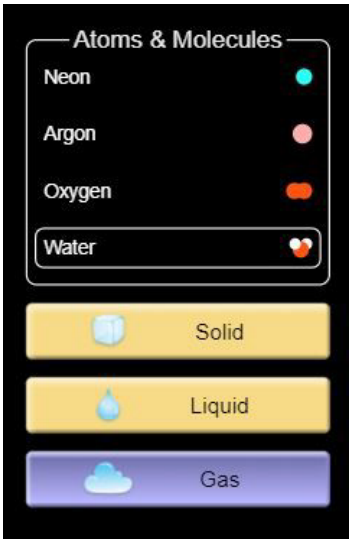
Instructions:

1) Go to: https://phet.colorado.edu/sims/html/states-of-matter-basics/latest/states-of-matter-basics_en.html

2) Select **"States"**



3) Select **"Water"** as your molecule type and **"Gas"** as your state of matter found on the right side of the screen.



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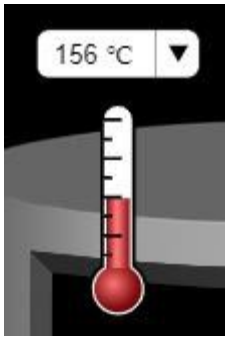
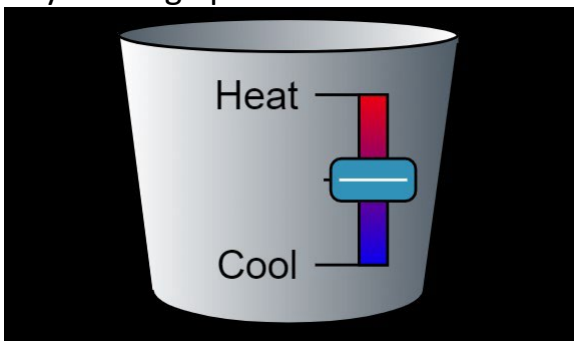
4) Make sure to change the temperature to Celsius (°C) by opening the drop-down menu above the thermometer.



5) Each of the red and white structures is a water molecule. Water can change into gas form at 100°C and above so at 156°C the molecules you are seeing are in gas form. Observe how the water molecules are behaving.

6) Increase the temperature by heating up the molecules. Move the "Heat/Cool" scale up.



How does adding more heat make the water molecules behave?	

7) Decrease the temperature by cooling off the molecules. Move the "Heat/Cool" scale down. Notice the thermometer begins to go down.

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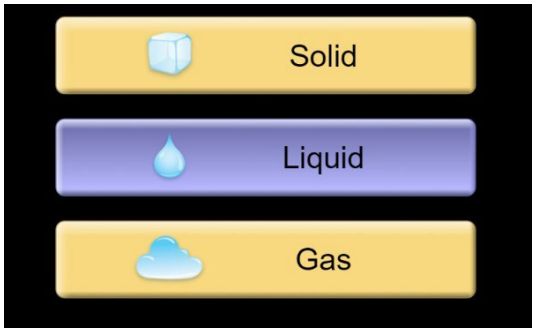
What do you observe happening to the molecules as heat is removed?	
Are the molecules moving closer together farther apart?	
Are the molecules moving faster or slower? Why?	

8) Select liquid as your state of matter. Below 100°C the water molecule begin to change from a gas to a liquid.



What do you notice about the structure of the liquid water molecules?	

9) Try decreasing the temperature by using the “Heat/Cool” scale.

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Do the molecules move closer together or farther apart as heat is removed?	
Are the molecules moving faster or slower? Why?	

10) Select solid as your state of matter. At 4°C liquid water molecules begin to change into solid water molecules. The more common name is ice!

What do you notice about the structure of the solid water molecules?	

11) Try decreasing the temperature by using the “Heat/Cool” scale.

In their ice form are the molecules closer together or farther apart than they were in liquid form?	

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Thinking about what you've observed, do you think an ice cube will float or sink in a cup of water?	
Which state of matter has the fastest moving molecules; gas, liquid, or solid?	
Which state of matter has the slowest moving molecules; gas, liquid, or solid?	
What causes water to change from solid to liquid to gas?	
Thinking about what you observed, how does this affect water moving through the water cycle?	